

THE GANGUE

The newsletter of the
Mineral Deposits Division
Geological Association of Canada
No. 22 **Oct 1985**

MICHAEL (MIKE) KNUCKEY WINS 1985 DERRY MEDAL:

The Mineral Deposits Division is pleased to announce that the winner of the Duncan R. Derry Medal for 1985 is Michael J. (Mike) Knuckey.

Mike has received this award in recognition of his achievements and contributions as an outstanding Canadian economic geologist:

- for his very successful discovery record;
- for his willingness to offer support to his staff and others in scientific research related to mineral deposits; and
- for his ability to raise the support for some outstanding exploration projects which have made him, and his company, the envy of the MDD and our industry.

He was born in Cornwall, England - as befits a good mining man - and graduated from the Royal School of Mines in 1957. His future success thereby all but assured, he moved to Canada. He worked at Lacnor (Elliot Lake), East Malartic, and the Coniagas Mine before leaving for the La Luz Mine in Nicaragua in 1971. At the Coniagas, his work added considerably to the ore reserves, leading to an expansion of the mill and extending the life of the mine. In Nicaragua, he discovered two gold-silver deposits, later to become producing mines.

His real claim to fame, however, came when he moved to Noranda in 1973 as Chief Geologist for Falconbridge Copper. He is reported as originally being a sceptic about the volcanogenic model for massive sulphides, reflecting the epigenetic thinking of many of the ore-discoverers in the district who were still active at that time. However, his willingness to listen to the ideas of others, together with his knowledge of volcanos and volcanic topography gained in Central America, soon made him realize both the potential of the stratigraphic model and the importance of synvolcanic structures as controls on the localization of massive sulphide ore deposits.

Compared with the then accepted idea that the deposits of the Noranda Camp all lay on one horizon, he recognized that if the ore-bodies could be stacked on a local scale - as was then being demonstrated at Millenbach - then they could also be stacked on a regional scale, with all that that implied for the potential of the district. The result of this insight was the subsequent discovery of the Corbett Mine in 1974 and the Ansil deposit in 1981.

Mike moved to Toronto in 1978 as Chief Geologist for Falconbridge Copper (now Corporation Falconbridge Copper), and in 1982 became their Vice-President, Exploration. He was instrumental in continuing the company's exploration successes, with the discovery at Winston Lake and the soon to follow success at Rea Gold in British Columbia.

As many in the industry will recognize, all these bright exploration ideas and geological insights would be for naught if Mike did not also have a particular talent for convincing management of the appropriateness and financial advantages of undertaking the exploration programs which he proposed. And as if Mike's geological insight, discovery record, and business and personnel skills were not sufficient measure of his excellence, he has also made a special effort to report the results of his projects and research, and has provided substantial support to research by others. He and his co-workers have published a number of critical papers, and perhaps less well recognized is the fact that he has been behind many publications by his staff and others at various Canadian Universities. He has made many presentations to professional groups and hosted countless mine and field trips at Noranda.

Mike Knuckey is an outstanding economic geologist. His discovery record, and his support of the efforts of his staff and others are a major contribution to economic geology in Canada. He is a most worthy recipient of the Duncan R. Derry Medal.

EDITORIAL:

I, like my illustrious predecessor Ken Dawson, am not much on Editorials. However, I think a few words of introduction are in order. First, let me apologize for the delay in producing my first issue of the Gangue. Changing careers, moving across the Country, and the field season are not conducive to extra-curricular activities, but I hope we can settle down to a less irregular publication schedule as the years go by.

There will inevitably be errors and omission, and the Gangue may not always resemble Ken's very professional productions, but I will do my best to get the news to the MDD membership. Which brings me to a very important point - I can't publish what I don't have. I therefore urge all of you - if you have anything that you want to expose to the other members of the MDD, please send it to me for publication. I don't promise to print everything exactly as written, but I will try to get at least a precis of your item into circulation if there is room and if it is still current when I get an issue to press.

Next, let me add my congratulations to Mike Knuckey on his winning of the Duncan Derry Medal. Mike's work should, I think, be an inspiration to us all, especially those in Industry. I am also happy to note that Mike has recently joined GAC. I guess it's one way to get new members!!

On the following pages of this issue are announcements for various field trips, short courses and symposia. I urge the membership to take advantage of these events, as this is how the MDD will continue to thrive. Also, I see the Gangue as a vehicle for flying trial balloons. If you have an idea for an event and want to solicit reaction, please send your thoughts to me and I shall pass them on to the membership.

Since this particular issue seems to have filled up very quickly, some reports have been postponed for later publication. I have plans to try to institute some semi-regular columns or features, including "Letters to the Editor"; if any member feels moved to write such letters, I shall be happy to print them.

One topic of considerable interest to all members is the ongoing problem of publication of ore-deposit related papers, and the (perceived) lack of such a venue in Canada. Much backroom discussion is going on at present regarding this problem, and I hope there will be positive developments to report later this year.

I have been asked to generate a proposal on how to get more MDD interest articles into Geoscience Canada by starting a Feature Series. I therefore appeal to the membership for two things:

- 1) Do you think it's a good idea?
- 2) Do you have any ideas on how we should go about it?

If I don't receive any response to these questions, especially the first one, I'll be forced to assume that the membership doesn't really think it is a good idea! Also in this vein (pardon the pun!), plans are well in hand for a Reprint Series for the Ore Deposit Model Series from Geoscience Canada, similar to the very successful Facies Model Series. When this publication is printed, it will be a welcome addition to all our libraries.

It is indeed an honour to have been chosen (or should I say railroaded?) as the official chronicler of MDD news. I hope the Gangue will continue to be an important part of MDD membership, and that I can at least "please some of the people some of the time."

Giles Peatfield

NOTE:

In Gangue 21, Lee Barker had two addresses. I know that Lacana is well off, but . . . ! Lee's correct address is:

A. Lee Barker
Lacana Mining Corporation
P.O. Box 19
Suite 1702 - 150 King Street West
Toronto, Ontario
M5H 1J9

ROBINSON GUEST LECTURER:

Ron McMillan is co-ordinating Dr. J.G. Thurlow's trips to present his talk on the geology and mineralization at Buchans, Newfoundland. The MDD is especially keen to see that Dr. Thurlow and succeeding Robinson Lecturers are available to speak to smaller geological groups or institutions country wide, who may be off the main lecture circuit. If your group is interested, even though you are not in a large centre, please contact Ron at:

Westmin Resources Ltd.
Suite 1400 - 25 Adelaide Street East
Toronto, Ontario
M5C 1Y2

As explained in a previous Gangue, travel costs for Robinson Lecturers are covered by the Robinson Fund, but local expenses for the speaker are the responsibility of the local group.

MDD JAPAN FIELD TRIP - APRIL 1985

On April 13, 30 intrepid explorers boarded CP-001 in Vancouver bound for Japan. Fourteen hours later, after a brief stop-over in Tokyo, we arrived in Osaka to be greeted by our guides, Tetsuro Urabe and Steve Scott, and the odyssey began.

Next day, we boarded an All Nippon Airways flight to Kagoshima, at the southern tip of Japan and were greeted by tropical weather conditions and a blowing volcano (Sakurajima). Here, our two local guides, Munetomo Nedachi from Kagoshima University and Toshio Mizuta, from Kumamoto University directed us to the geothermal fields at Kirishima, our first stop. This field is still in the exploration stage, with two test wells producing 40 tonnes of steam per hour. 500 tonnes are required for a 50 MW plant. Detailed mineralogical work, including thin section and XRD, has outlined a clay-altered cap underlain by a strongly veined and brecciated silicified feeder zone, which produces the steam.

The Japanese love hot baths and resort spas are developed adjacent to most of the hot spring areas. As a result, geothermal exploration is relegated to the more remote or deeper systems, thus increasing expenses considerably, Japan produces 260 MW from nine commercial geothermal plants, the largest of which is 55 MW.

Our oversized Japanese tour bus had some difficulty negotiating the narrow mountain roads but, with great persistence, we reached the Kirishima Kokusai Hotel and a traditional Japanese feast complete with several rounds of "Shoshu", a locally distilled delight. During the course of the meal, Steve Scott eloquently explained the proper etiquette in tackling the various unidentifiable but usually quite tasty morsels with our bamboo chopsticks, and whetted our appetite for adventure with his dialogue on the do's and don't's of the "Ofuro", the Japanese public bath. Our delightful post-dinner ofuro was followed by more Shoshu, while "Papa-san" Mike Knuckey entertained the locals.

Our continuing trip through the south included examples of young (0.1 Ma) hydrothermal alteration within the 1.5 Ma Kohuto caldera. In the same district, we were the first group ever, foreigners or nationals, to visit the high grade Hichikari Mine. These low sulphide quartz veins, predominantly within the basement rocks, are evidently well below the level of the extensive alteration we had viewed earlier in the day.

The deposit, owned by Sumitomo, will provide direct shipping ore doubling as a silica flux for their smelter. At present, reserves are quoted at 1.5 Mtonnes grading 80 g/t Au and 40 g/t Ag in four veins. Hot water from the underground workings, at 60 to 65 degrees C, is piped to the local spa.

The other gold mine visited, the Iwato, contrasted sharply in that the mineralization is contained within the silica zone near the top of a high level epithermal system. The silicification and mineralization flood a pyroclastic unit between two flows. Grades are significantly lower, at 3 to 5 g/t Au, with an open pit production rate of 100,000 tpy. Historically, this district has provided approximately 20% of Japan's gold production. The mine has been given a new lease on life with recent discovery of a new ore zone.

Next stop: The Jungle Bath. The beautiful Ibusuki Kanko Hotel is a modern resort which boasts the most famous bath we visited. It is set in a room the size of a large auditorium with jungle vegetation, statues, and a number of pools ranging in temperature from hot to hotter. A few brave (foolhardy?-Edit.) souls were tempted by the sand baths, steam heated beach sand, and were blistered for their efforts.

Next morning we travelled to the island of Sakurajima to view the volcano at close range, brave the windblown ash and pose for a group photo. Back in Kirishima, where volcanic ash is the number one health problem, our local guides left us at the train station for an overnight train ride to Himeji, just south of Osaka. Needless to say, the perpetually spotless Japanese train system took a bit of a beating during the evening "geological discussion" session, but the real challenge was pouring 32 overloaded, under-coordinated geologists through a very narrow train car door during a 30 second station stop. We made it!

At Himeji, we visited the 16th century castle where the movie "Shogun" was filmed. We then visited the Mitsubishi pyrophyllite quarry. The pyrophyllite formed along zones of alteration within felsic pyroclastics where they are capped by shale horizons. Although no gold has been reported from the system, many in the group felt that some drill holes within the pyritic siliceous feeder zones under the pyrophyllite might be in order.

At this point, the tour split into two groups. Group 1, which out-drunk Group 2 by a 3:1 margin, visited the Yanahara Mine, the only Besshi-type

deposit still in production in Japan. Three major ore types include Pyrite (0.04% Cu, 45.76% Fe), Cupriferous Pyrite (2.61% Cu, 42.0% Fe) and Pyrrhotite (0.52% Cu, 57.28% Fe). There is some controversy as to whether the mafic footwall rocks are intrusive or extrusive. Some of the "felsite" which surrounds the ore, an anomaly for Besshi-type mineralization, may in fact be altered sediments.

The Akenobe Mine, visited by Group 2, is controlled by Mitsubishi Metal Corporation and has a history dating back to the 9th century. The deposit consists of a series of more than 100 polymetallic (Zn, Cu, Sn, W, Ag, Au) veins that are hosted in Permian Maizuru Group sediments and volcanics. The veins are considered classic xenothermal type and are characterized by reverse zoning from early Pb-Zn to late Sn-W. Since 1955, 14 Mtonnes of ore, averaging 1.09% Cu, 2.0% Zn, and 0.37% Sn has been produced. Current production rate is 27,000 tonnes/month averaging 1.2% Cu, 4.7% Zn, and 0.22% Sn. In the afternoon, the group toured the Ikuno Mining Museum and Mitsubishi Mineral Collection which is famous for its stibnite crystals.

Next stop was Kyoto and a day of sightseeing. We were treated to the simple beauty of the gardens and artwork in the many shrines and temples within the city. The Ryoanji Temple contains one of the finest of the Zen rock gardens - thirteen rocks of various shapes and sizes set off in a sea of carefully raked white gravel.

Northward to Toyama and the Kamioka Mine, one of the world's largest Zn producers. These deposits are skarns within rocks of the Hida Complex, a high-grade metamorphic terrain of skarns and amphibolite gneiss. Some argument within the group suggested that the deposits might indeed be metamorphosed Mississippi Valley mineralization. Others saw similarities with Broken Hill, although the grade here is relatively low (5.3% Zn, 0.87% Pb, 35 g/t Ag). The mine, mill and smelter complex is powered by company-owned hydro-electric plants. A total of 57 Mtonnes of ore have been mined from the district, and reserves presently stand at 30 Mtonnes.

Steve Scott loves a good Hanami - the main ingredients of which are cherry blossoms (to sit under) and saki. Despite the fact that the cherry blossoms had pretty well disappeared from Toyama, if indeed they were ever there, we certainly had no trouble finding several litres of saki. So, under the imagined blossoms we sat, and drank, and awaited the afternoon train to Ohdate, in northern Japan.

We split into two groups again for the Kuroko tour, with one half going to the Matsumine Mine and the other to the the Shakanai Mine. Both are underground operations, and the conditions underground are impressive - hot, wet and very unstable due to the high clay content of the ore and wall rocks. Timbers and steel sets showed tremendous strain. Mining costs are thus very high. Average grades at Matsumine are 1.7% Cu, 0.7% Pb, 2.5% Zn, 39 g/t Ag and 0.4 g/t Au, at a production rate of 41,250 tonnes/month, while at Shakanai, grades are 1.76% Cu, 2.5% Pb, 8.76% Zn, 121 g/t Ag and 0.7 g/t Au, mined at a rate of 21,500 tonnes/month. The two mines consist of several separate ore lenses, and the workings of the two companies are divided by a claim boundary. Total reserves, past and present, for the Ohdate district are estimated at 100 Mtonnes.

We were impressed with our firsthand view of these famous ores, in particular the very close association with felsic domes, which are often expressed at surface as small hills surrounded by the rich Ohdate rice fields. (Local subsidence above workings is very unpopular with the farmers.) Another close association of the ore is with a persistent mudstone horizon which thickens near the ore and provides evidence of sulphide deposition in local depressions on the sea floor.

The relative proportions of black, yellow and siliceous ore vary significantly from one deposit to another. The most recent discovery in the district, the Nurukawa deposit, which happily occurs near the intersection of two "Scott" linears, reportedly contains 3 Mtonnes of predominantly black ore. It is reputedly one of the richest deposits yet discovered, with very high Au and Ag values.

Geophysics and exploration drilling have been carried out extensively in the Kuroko region. While geologic interpretation from drill core combined with geophysical interpretation have been the most successful exploration tool in the past, major element geochemistry, particularly Na depletion in footwall rocks and Na + Ca enrichment as a halo several hundred metres out from the deposit in and above the ore horizon, is becoming more widely accepted as a very discriminating ore locator.

In the afternoon of the same day, the two groups visited the Motoyama open pit of the Kosaka Mine. Although mined out, with no ore exposures, we had a good look at the associated volcanic dome and the footwall breccias. Very evident in these breccias are fragments of basement rock, graphitic

phyllite, derived from at least 300 m below the ore horizon and transported up section apparently by explosive volcanic activity.

Tired and thirsty, we retired to a hot bath at the Ohyu Ryokan (these must be the world's cleanest geologists! - Edit.). That evening, after one of the finest Japanese meals of the trip (judging by the amount of saki consumed!), we were treated to an evening of entertainment by four geishas. The lead singer had the entire group up dancing to "The Miner's Song", which is apparently quite popular in that district. While it is unlikely that these unique Canadian interpretations of an ancient Japanese art form will be the start of a cultural revolution, Ed Chipp's video recording of the evening might provide interesting blackmail material, if it is in focus. (I doubt if much of anything was in focus, after all that saki! - Edit.)

Last day of touring, en route back to Tokyo, we visited the 10 MW Onuma geothermal generating plant and the adjacent Goshogate Hot Spring, home of the famous mud volcanos. Some of these, over one metre high and composed of a fine, black, muddy precipitate, reportedly contain significant amounts of iron sulphide.

The trip back to Tokyo was aboard the impressive 220 kph Shinkansen or Bullet Train. The ride was comparable to the smoothness of a 747, but much quieter.

In Tokyo, some of the group spent an afternoon making presentations to the Geological Society of Japan (Pat MacGeehan - Australian Gold Deposits; Dave Comba - Hemlo; Dave Watkins and Mike Knuckey - Canadian and US Massive Sulphides; Steve Scott - Research of Active Deep Sea Sulphide Deposition). That evening, the Canadian Embassy hosted a reception for our group which was also well attended by a large number of Japanese mining executives.

Thanks to Jeff Franzen's great effort over 18 months and his organizational talent we enjoyed a faultlessly executed trip that was enjoyed thoroughly by all. Nobody missed a train or plane, and all the luckymine managers we visited are at home with a bottle of Alberta Sipping Whiskey, while the mine geologists are out playing ball with their new Vancouver Canadians baseball caps. The geological itinerary, with liberally interspersed "cultural" stops, was arranged by Tetsuro Urabe. The trip was all the more successful thanks to Tetsuro's planning, the groundwork he had laid at each stop, and the excellent guiding he provided during the tour. Steve Scott, our "colour commentator", as well as ably assist-

ing in the trip leadership, often provided that all important introductory liaison between Canadian and Japanese cultures which significantly enhanced our enjoyment of the trip.

From here most of the weary travellers headed homewards. Some, however, took advantage of the situation to continue travels through Japan or to embark on package tours of Hong Kong and adjacent Mainland China, thoughtfully arranged in conjunction with the field trip.

Gerry Carlson, with assistance from Carl Verley.

UPCOMING FIELD TRIPS:

"Ottawa '86":

Charles Jefferson (GSC, Ottawa) announces that eight dynamic, mineral deposit oriented field trips are being organized in conjunction with the joint annual meeting of GAC-MAC-CGU ("Ottawa '86") to be held in Ottawa May 19-21, 1986. Plans for these trips are well advanced with details as follows:

1. Proterozoic Sediment-Hosted Stratiform Copper Deposits of Upper Michigan and Belt Supergroup of Idaho and Montana - May 10-16.
Co-ordinated by R.V. Kirkham and A.C. Brown as part of the Symposium on Sediment-Hosted Stratiform Copper Deposits. This trip will start in Marquette, Michigan with stops at: Kona Dolomite (stratabound copper); Negaunee Iron Formation; Keweenaw native copper; White Pine stratabound copper. A connecting charter will take participants to Spokane followed by bus transportation to the silver-copper district of the Belt Supergroup: Coeur d'Alene silver (Lucky Friday and Coeur mines); and Spar Lake stratabound Ag-Cu. The cost has not been finalized but will be in the range of \$Can. 2,000.00, with \$500.00 required to reserve one of 40 places.
2. Late Carboniferous basins of Nova Scotia - May 13-17.
Coordinated by G.M. Yeo, this trip will examine the stratigraphy, tectonics, mineral deposits and energy resources of Sydney Basin, Mabou Basin, Pictou Basin and Tatamagouche Syncline. The trip starts in Sydney, N.S. and ends in Moncton with an estimated cost of \$400.00 excluding airfare, for one of 30 places.
3. Mineral Resources of Central Metasedimentary Belt, Grenville Province - both before (May 15-18) and after (May 22-26) Ottawa '86, if interest is sufficient.
Coordinated by R.M. Easton and T.R. Carter, the trip starts in Toronto and ends in Ottawa with the following tentative stops: Indusmin nepheline syenite (Nephton); Cordova Gold Mines; Deer Lake rusty schist, a Zn-Cu-Ag prospect in Belmont Twp.; Marmoraton iron mine (Marmora); Madoc talc mine; Canadian Sulphur Ore/Blakely Pyrite; Omya-Amiko Mica; Spry Zinc/Renprior Zinc; Addington Au; RAM tremolite; Marlhill calcite; Kirkham graphite; Perth calcite, marble quarry, blue marble; Barryvale Fe-Ti;

Hunt Moly; Renprior/Cadieux Zinc; Chromasco Magnesium, Goshen Uranium; Cantley mica, Quebec; Asbury graphite, Notre-dame-de-la-us; Villeneuve mica, Notre-dame-de-la-salette; Holland Mills asbestos, Quebec. (And in your spare time, . . . ! Edit.).
The cost will be about \$380.00.

4. The Hemlo Gold Deposits, Ontario - May 15-17. Coordinated by D.C. Harris and G. Patterson, this trip starts and ends in Thunder Bay. It will include a regional geological introduction but concentrate on important new details of deposit geology with underground visits to main ore zones and guided tours by mine geologists. (I would venture to say that even though large numbers of geologists have toured Hemlo already, this trip will be very popular - best to book early! Edit.) The cost from Thunder Bay will be about \$300.00 for each of 30 - 40 people.
5. Timmins, Ontario: Exceptional Exposures of Archean Subaerial and Shallow Subaqueous Volcanic Rocks, and Associated Ore Deposits - May 13-17. Run by C.D.A. Comba, A.H. Green, W.P. Binney and R.D. Stewart, this trip begins and ends in Timmins. Featured will be spectacular physical volcanology of the area (intrusive stockworks, subaerial rhyolite pyroclastic flows, debris flows with transported sulphide clasts, basalt spindle bomb and lapillus outcrops, komatiitic flows at Pyke Hill, basaltic spatter and possible thermal melt-out channel beneath peridotite flows) as well as mine tours to Kidd Creek and Dome mines. (Based on my experience with the organizers and with many of the outcrops to be visited, this promises to be a superb trip, and I strongly recommend early reservation - Edit.) The cost while in Timmins will be \$460.00, with room for 30 participants.
6. Kupferschiefer and Other Sediment-Hosted Deposits in Central Europe - May 23-June 1. This trip to West Germany and Poland is being hosted by the Federal Geological Survey and the Hesse State Survey in West Germany and by the Institute of Geology in Poland, and is being coordinated by E.C. Jowett. Participants will fly from Toronto to Frankfurt on May 23, then loop through Germany and Poland by bus, returning Frankfurt to Toronto on June 1. Anticipated stops in Germany (3 days) include:
 - a) outcrop of the Rotliegendes continental sequence of bimodal volcanics and redbeds underlying the Kupferschiefer in the Nahe Valley, b) drill core in the Hesse State core library near Wiesbaden, and c) Kupferschiefer and Zechstein outcrops at Cornberg, Rotenberg, and Harz Mountains. Four days in Poland will permit visits to d) Rotliegendes and Zechstein outcrops in the southwest, e) underground and open pit Kupferschiefer mines including the Lubin and Konrad districts, and f) underground visits to Silesia-Cracow Zn-Pb deposits in Triassic Muschelkalk carbonates. Total cost will be about \$Can. 2,200.00, with a deposit of \$500.00 required to reserve one of 20 places.
7. Layered Intrusions of Northwestern Ontario and Southeastern Manitoba - May 22-25. Run by the GSC Ultramafia, this trip commences in Winnipeg on May 22 and ends in Thunder Bay of May 25. Those wanting to learn the nuances of gold, platinum-group metals and chromite in layered intrusions will visit the Bird River Sill, Falcon Lake Stock and Mulcahy Lake Intrusion. (In spite of the somewhat sinister sound of the organizing committee, this should

be a very worthwhile excursion, given the current high level of interest in platinum-group metal deposits - Edit.)
Cost from Winnipeg to Thunder Bay will be \$300.00 each for 20 to 40 participants.

8. Structure and Gold, Rouyn to Val D'Or. Run by C. Hubert, F. Robert and B.E. Gorman, this trip will examine structural and lithologic settings of gold deposits in greenstones, granitics, and sedimentary rocks. Underground tours of Sigma, O'Brien, Bousquet, Canadian Malartic and East Malartic properties will be coordinated with outcrop visits. Cost for each of 22 to 25 participants will be \$400.00, which includes group airfare from Montreal and return.

To reserve places on these trips and receive more information, send a cheque for the full quoted price of the trip (Canadian \$) - except \$500 deposit for the two sedimentary copper trips - payable to 'Ottawa '86', to C.W. Jefferson, Geological Survey of Canada, 601 Booth Street, Ottawa, Ontario, Canada K1A 0E8.

Spain/Portugal - April '86

For details of this trip, please refer to Gangue 21 (May, 1985). Ian Paterson advises that the trip is full with a short waiting list, but he urges anyone interested to contact him and get on the list, as there are often last-minute cancellations, especially on overseas trips. He can be reached at:

Cominco Ltd.
700 - 409 Granville Street
Vancouver, B.C. V6C 1T2
(604) 682-0611 loc. 2255
Telex: 04-507730

Other organizers are Scott Swinden (Nfld) and Bruce Winfield (Madrid). See Gangue 21 for their addresses.

Brazil - November '86

Luca Riccio advises that planning is progressing well, and he hopes to have a detailed circular available by yearend. All interested parties are urged to contact Luca at:

1440 Paisley Rd.
North Vancouver, B.C.
V7R 1C3
(604) 980-7752

New Zealand:

Prof. David Mossman of Mount Allison University is interested in organizing a field trip to visit New Zealand, with emphasis on economic geology aspects. This trip is very much in the idea stage but anyone who is interested, especially those willing to help David with organization, should contact him at:

Department of Geology
Mount Allison University
Sackville, New Brunswick
EOA 3C0

When David has some feeling for potential interest, he will be able to make a formal proposal to the MDD Executive for assistance.

SHORT COURSES:

The Application of Structural Geology Mapping Techniques to Mineral Exploration.

The MDD has postponed this eight day field course until the Spring of 1986. It is now scheduled for May 30 - June 7, well after the GAC-MAC-CGU Annual Meeting in Ottawa ("Ottawa '86").

The course is directed towards mineral exploration and mining geologists and will combine field and classroom sessions, with the emphasis on the field.

The initial two days of the course will be spent in the classroom, where a review of basic structural mapping concepts and their practical application will be given. Possible topics include:

- review of three dimensional, geometric elements;
- structural drill hole data interpretation;
- observation and preliminary analysis of fracture data;
- fault geometry, stress and vein patterns;
- quantitative construction of cross-sections, sub-surface (level) maps, structure contour maps, projection of surface, drill-hole and geophysical data onto cross-sections and sub-surface maps; and
- geometry of polyphase deformation - recognition, documentation and analysis.

Further instruction will then take place in the field. Course participants will be grouped into twos and threes and expected to map a specific area or areas. For this part of the course it is hoped to have an instructor : participant ratio of 1:4 or 1:5. The completed mapping will be reviewed.

The final part of the course will consist of a day reviewing case histories relevant to the theme of the course.

Instructors will be:

Dr. R.L. Brown	- Carleton University
Dr. J.T. Fyles	- Consultant, Victoria
Dr. P. Read	- Geotex, Vancouver
Dr. P.S. Simony	- University of Calgary
Dr. D.A. Shaw	- Chevron Canada Resources, Calgary

The course will be located in southeastern British Columbia and based in Nelson. Fieldwork will be carried out on the Sheep Creek Anticline and in

the Salmo Lead-Zinc belt or in the Phoenix-Granby copper pit area. The length of the course will be eight days, and the number of participants limited to twenty. The tuition cost is expected to be approximately \$600.00, which does not include the cost of room and board or travel to and from Nelson.

Detailed plans for the course will be drawn up this fall with dates and exact costs. Those interested in attending or in obtaining more information should write to:

Dr. D.A. Shaw
Chevron Canada Resources Ltd.,
500 Fifth Avenue South West
Calgary, Alberta
T2P 0L7

We expect this course to be over-subscribed, so to insure a place you should contact Dr. Shaw as soon as possible.

"Ottawa '86"

Note also the two short courses offered as part of "Ottawa '86" - the joint annual meeting of GAC, MAC, & CGU.

MAC-sponsored short course, "Silicate Melts: Their Properties and Structure, Applied Problems in Geochemistry, Petrology, Economic Geology and Planetary Geology" is being organized by C.M. Scarf, University of Alberta.

CGU-sponsored short course, "Interpretation of Gravity and Magnetics for Non-Specialists" is being organized by A.K. Goodacre, Earth Physics Branch, E.M.R.

Further information will be forthcoming in the "Ottawa '86" circulars.

SYMPOSIA :

A Symposium on Sediment-Hosted Stratiform Copper Deposits: Ottawa, May 17 - 19, 1986:

The MDD and the Mineralogical Association of Canada (MAC) are organizing an international Symposium on sediment-hosted, stratiform copper deposits as part of the joint annual GAC-MAC-CGU meeting to be held in Ottawa in May, 1986 ("Ottawa '86").

Mineral deposit and mineral district descriptions, tectonic settings, age relationships, ore-forming processes, exploration guides and the role that basinal fluids play in deposit genesis will be featured in the technical program.

Sediment-hosted stratiform copper deposits have been the subject of considerable research in several parts of the world and new concepts and hypotheses have been developed. In addition to copper, this family of deposits also contain significant amounts of silver and cobalt and, in certain locations uranium, gold and rare earth elements.

Technical and Poster Sessions:

The technical program will include presentations on deposits in the Lubin district of Poland, the Zambian and Zairian Copperbelts, the North American Redstone, Spar Lake and White Pine districts and possibly important deposits in the Soviet Union, China and Australia. Invited speakers will present current interpretations from these important regions. Additional talks will be given on sediment diagenesis and basinal fluid geochemistry and migration.

A series of poster displays are being planned as an integral part of the symposium.

A prominent objective of the meeting will be to identify features and criteria of the sedimentary copper environment of significance in mineral exploration.

Field Trips:

An excursion to the Michigan Copper District and to the Spar Lake area of North America will be arranged prior to the meeting (May 10-16, 1986). In addition, initial planning is underway for a post-symposium 7-10 day field visit to West German and Polish field areas with mine visits in Poland (commencing May 23, 1986). Visits to core libraries in West Germany and to government offices in Poland will be part of this trip.

Call for Papers:

Although invited speakers will address the symposium, unsolicited papers will constitute a major part of the program. The Organizing Committee has encouraged the submittal of abstracts of quality papers on the symposium theme and closely related topics. Authors and other delegates may also submit proposals for poster displays.

Titles of proposed papers were due to be submitted by June 30th, 1985, with abstracts due by October 15th, 1985. If you have a late-breaking idea for a presentation you should not hesitate to contact the organizers to see if it can be fitted into the program.

Publications:

A volume containing both invited and unsolicited papers will be published as soon as possible after the symposium. All authors will be required to submit final manuscripts at the time of the symposium.

Location and Date:

Registration for the symposium will commence on the evening of Friday, May 16th, 1986 and the technical and poster sessions will end at noon on Monday, May 19th, 1986. Poster displays will be open throughout the meeting. Delegates will register for both the symposium and the GAC-MAC-CGU Annual Meeting. Lower cost preregistration rates will be offered. All speakers, field-trip participants and poster session exhibitors will be required to pre-register.

The technical program of the Annual Meeting will begin on Monday, May 19th and end on Wednesday, May 21st, partially overlapping and continuing after the symposium.

Registrants attending both the symposium and the Annual Meeting (Ottawa '86") will have a choice of a range of accommodations from first class hotels to university residences.

Further Information:

The Second Circular will be sent to prospective authors, exhibitors and those expressing interest in the meeting upon request. This circular has more detailed information on the program, accommodation and costs. Also included will be the registration forms for the symposium and the field trips, abstract forms, poster display information and instructions to authors.

All enquiries concerning the symposium should be addressed to:

Sediment-Hosted Stratiform Copper Deposits
c/o E. Craig Jowett
Earth and Planetary Sciences
Erindale College, Univ. of Toronto
Mississauga, Ontario
L5L 1C6

Gold '86:

Planning continues apace for this major international symposium, as described in Gangue 21. Eric Craigie is heading up the organizing committee and would be pleased to answer requests for more information. His address is:

BP - Selco
Suite 1700 - 55 University Avenue
Toronto, Ontario
M5J 2H7

CAME '86 - BYTING THE ROCKS:

The sponsoring societies of Computer Applications in Mineral Exploration invite your participation in the second CAME Conference and Exhibition to be held on January 14 and 15, 1986, at the Sheraton Centre, Toronto.

The objectives of CAME '86 are the same as those of the very successful 1984 conference - to familiarize everyone involved with all the various computer services and facilities available. This conference and exhibition is intended to bring the user up to date with developments in this rapidly changing area.

The exhibition will present displays and hands-on demonstrations, as well as special classroom style sessions in oversize booths. The formal PRESENTATIONS will be in the immediately adjacent theatre. These will emphasize practical experience gained by users of currently available systems, as well as recent developments by service organizations and manufacturers. The EXPANDED ABSTRACTS will be published in a volume to be included in registration.

Expanded abstracts (1000 to 2000 words) must reach the program chairman by Oct. 31, 1985. Please send to:
Grant Troop
Ontario Geological Survey
77 Grenville Street
TORONTO, Ont, M5S 1B3

Sponsoring Societies are: Canadian Exploration Geophysical Society (KEGS); MDD; Toronto Geological Discussion Group (TGDG); Association of Exploration Geochemists (AEG); and Canadian Institute of Mining and Metallurgy (CIM).

For more info: Terrence Bottrill
Bottrill Geological Services
192 Weldon Avenue
OAKVILLE, Ontario L6K 2H8

MORE FIELD TRIPS:

The Volcanology Division of GAC still has 5 - 10 spaces available on its Trans Mexican Volcanic Belt Field Trip, Jan. 4-18 1986. Non Volcanology Division and non GAC members are welcome on a first come first served basis.

The trip, led by Drs. Gerrardo Sanchez-Rubio of the National Univ. of Mexico, Guanajuato and Steve Nelson of Tulane Univ., will start from Mexico City and visit Popocatepetl, Amealco Caldera, Toluca, Paricutan, Colima caldera, etc., etc, and will end at Puerto Vallarta. The fee of \$800 Can. includes accommodation (double), local transportation, most meals, a guide book and field guide's expenses. Air travel to and from Mexico is extra; group fares from various Canadian centres are available from Falcon Travel in Vancouver.

For more info: Walter Gibbins
P.O. Box 1500
Yellowknife, N.W.T. X1A 2R3
(403) 920-8216
Telex 034-45519

ACKNOWLEDGEMENTS:

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SEMINARS:

I would be pleased to print times and topics for any interested University Departments or other Geoscience Organizations. Due to the irregular publication schedule of the Gangue, there is no guarantee that your seminars or meetings will be publicized, but if you can let me know far enough in advance, I can get at least some announcements into print. Interested parties should send notices of their upcoming seminars or meetings to me at:

MineQuest Exploration Associates Ltd.
201-311 Water Street
Vancouver, B.C. V6B 1B8
(604) 669-2251

Prospective attendees are advised to confirm with the Department or Group in question.

McMaster University, Hamilton

(All 3:30 p.m. (coffee) - Rm. S.S.C. - 303
4:00 p.m. (seminar) - Rm. S.S.C. - 102)

Tues, November 5, 1985
Dr. J. Gittins, University of Toronto
"Evolution of Carbonatite Magmas"

Tues, November 19, 1985
Dr. P. Fritz, University of Waterloo
"Methane in Crystalline Rocks of the Canadian Shield:"

Tues, November 26, 1985
Dr. Y.K. Chau, Canada Centre for Inland Waters, Burlington.
"Organolead Compounds in the Environment."

MEG (Mineral Exploration Group) - Vancouver

Meetings on Wednesdays, Hotel Georgia, 12 Noon.

Oct. 23: David Groves - Univ. of W. Australia
"Gold in Archean Terrains, with an Australian bias"

Oct. 30 Dave Trueman - Highwood Resources
"Recent developments at the Thor Lake beryllium deposit near Yellowknife, NWT."

Nov. 13 Peter Tegart - SEREM Inc.
Lawyers gold deposit, Toadoggone area, BC"

Nov. 27 Dick Lewis - Placer Development Ltd.
"Misima Island, a bulk low grade gold-silver mine in Papua New Guinea."

Dec. 11 Sandy Main - Archer Cathro & Associates (1981) Ltd.
"Gold mineralization and heap leaching potential in the Dawson Range, Yukon."

Jan. 11 Helmut Wober - Chevron Canada Resources
The Bear-Totem gold discovery at Muddy Lake, B.C."

PUBLICATIONS:

The following publications are available from the GAC (see address on order form). Special Papers 28 and 29, which will be of special interest to MDD members, have recently been published and are now available for purchase. Details of the content of these volumes are available from GAC headquarters if you are interested, please contact;

Dr. A.R. Berger
Geological Association of Canada
Dept. of Earth Sciences
Memorial University
St. John's, Nfld. A1B 3X5

